

PTO/SB/08A (08-03)

Approved for use through 07/31/2006. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A-B/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)	Complete if Known	
	Application Number	10/530,421
	Filing Date	May 4, 2005
	First Named Inventor	Peter G. Schultz
	Group Art Unit	Unassigned
	Examiner Name	Unassigned
	Attorney Docket Number	54A-000170US
Date Submitted	January 16, 2007	

U.S. PATENT DOCUMENTS						
Examiner Initials	Cite No.	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code (if known)			
/K.G./	1	6,927,042		Schultz et al		
/K.G./	2	7,045,337		Schultz et al		
/K.G./	3	7,083,970		Schultz et al		

FOREIGN PATENT DOCUMENTS								
Examiner Initials	Cite No.	Foreign Patent Document			Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T
		Office	Number	Kind Code (if known)				
/K.G./	4	WO	2002/086075		Schultz et al			
/K.G./	5	WO	2002/085923		Schultz et al			

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS					
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.			T
/K.G./	6	ALTENBACH ET AL. "Transmembrane Protein Structure: Spin Labeling of Bacteriorhodopsin Mutants." <u>Science</u> 248(4959):1088-92 (1990)			
	7	ANDERSON ET AL. "Exploring the Limits of Codon and Anticodon Size." <u>Chemistry and Biology</u> , 9(2):237-244 (2002)			
	8	AZOULAY ET AL. "Glutamine analogues as Potential Antimalarials." <u>Eur. J. Med. Chem.</u> 26, 201-5 (1991)			
	9	BAIN ET AL. "Biosynthetic site-specific Incorporation of a non-natural amino acid into a polypeptide." <u>J. Am. Chem. Soc.</u> , 111(20):8013-8014 (1989)			
	10	BARTON ET AL. "Synthesis of Novel α -Amino-Acids and Derivatives Using Radical Chemistry: Synthesis of L- and D- α -Amino-Adipic Acids, L- α -aminopimelic Acid and Appropriate Unsaturated Derivatives." <u>Tetrahedron Lett.</u> 43, 4297-4308 (1987)			
	11	BEGLEY ET AL. <u>Topics in Curr. Chem.</u> , eds. Leeper, F. J. & Vederas, J. C. (Springer-Verlag, New York), 195:93-142 (1997)			
	12	BOCK ET AL. "Selenocysteine: the 21st amino acid." <u>J. Mol. Microbiol.</u> 5(3):515-520 (1991)			
/K.G./	13	BOLES ET AL. "Bio-incorporation of telluromethionine into buried residues of dihydrofolate reductase." <u>Nat. Struct. Biol.</u> , 1(5):283-284 (1994)			

Examiner Signature	/Kagnew Gebreyesus/	Date Considered	08/09/2007
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

/K.G./	14	BRADLEY ET AL. "tRNA ² Gln Su+2 mutants that increase amber suppression." <u>J. Bacteriol.</u> 145(2):704-712 (1981)	
	15	BRICK ET AL. "Structure of tyrosyl-tRNA synthetase refined at 2.3 A resolution. Interaction of the enzyme with the tyrosyl adenylate intermediate." <u>J. Mol. Biol.</u> , 208:83-98 (1989)	
	16	BRUNNER, "New Photolabeling and Crosslinking Methods." <u>Annu. Rev. Biochem.</u> , 62:483-514 (1993)	
	17	BUDISA ET AL. "Bioincorporation of telluromethionine into proteins: a promising new approach for X-ray structure analysis of proteins." <u>J. Mol. Biol.</u> , 270(4):616-623 (1997)	
	18	BUDISA ET AL. "Residue-specific bioincorporation of non-natural, biologically active amino acids into proteins as possible drug carriers: Structure and stability of the <i>per</i> -thiaproline mutant of annexin V." <u>PNAS</u> , 95(2):455-459 (1998)	
	19	BUDISA ET AL. "Toward the experimental codon reassignment in vivo: protein building with an expanded amino acid repertoire." <u>FASEB J.</u> 13(1):41-51 (1999)	
	20	BUDISA ET AL. "High-level biosynthetic substitution of methionine in proteins by its analogs 2-aminohexanoic acid, selenomethionine, telluromethionine and ethionine in <i>Escherichia coli</i> ." <u>Eur. J. Biochem.</u> , 230(2):788-796 (1995)	
	21	CHIN ET AL. "Addition of a photocrosslinking amino acid to the genetic code of <i>Escherichia coli</i> ." <u>PNAS</u> , 99(17):11020-11024 (2002)	
	22	CHIN ET AL. "An Expanded Eukaryotic Genetic Code." <u>Science</u> , 301(5635):964-967 (2003)	
	23	CHIN ET AL. "Addition of p-Azido-L-phenylalanine to the genetic code of <i>Escherichia coli</i> ." <u>J Am Chem Soc</u> 124:9026-9027 (2002)	
	24	CHRISTIE & RAPOPORT. "Synthesis of Optically Pure Pipecolates from L-Asparagine. Application to the Total Synthesis of (+)-Apovincamine through Amino Acid Decarbonylation and Iminium Ion Cyclization." <u>J. Org. Chem.</u> 50(8):1239-1246 (1985)	
	25	CORNISH ET AL. "Probing Protein Structure and Function with an Expanded Genetic Code." <u>Angew. Chem. Int. Ed. Engl.</u> , 34(6):621-633 (1995)	
	26	CORNISH ET AL. "Site-Specific Protein Modification Using a Ketone Handle." <u>J. Am. Chem. Soc.</u> 118(34):8150-8151 (1996)	
	27	CRAIG ET AL. "Absolute Configuration of the Enantiomers of 7-Chloro-4 [[4-(diethylamino)-1-methylbutyl]amino]quinoline (Chloroquine)." <u>J. Org. Chem.</u> 53:1167-1170 (1988)	
	28	CREIGHTON. "Disulfide bonds as probes of protein folding pathways." <u>Methods Enzymol.</u> 131:83-106 (1986)	
	29	CROPP ET AL. "An Expanding Genetic Code." <u>Trends in Genetics</u> , 20(12):625-630 (2004)	
	30	DIAZ ET AL. "Biodegradation of Aromatic Compounds by <i>Escherichia coli</i> ." <u>Microbiol. Mol. Biol. Rev.</u> 65(4):523-569 (2001)	
	31	DOCTOR & MUDD, "Species Specificity of Amino Acid Acceptor Ribonucleic Acid and Aminoacyl Soluble Ribonucleic Acid Synthetases" <u>J. Biol. Chem.</u> , 238(11):3677-3681 (1963)	
✓	32	DORING ET AL. "Enlarging the Amino Acid Set of <i>Escherichia coli</i> by Infiltration of the Valine Coding Pathway" <u>Science</u> , 292:501 (2001)	
/K.G./	33	DOUGHERTY. "Unnatural amino acids as probes of protein structure and function." <u>Curr. Opin. Chem. Biol.</u> , 4(6):645-652 (2000).	

Examiner Signature	/Kagnew Gebreyesus/	Date Considered	08/09/2007
-----------------------	---------------------	--------------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

/K.G./	34	DUEWEL et al. "Incorporation of trifluoromethionine into a phage lysozyme: implications and a new marker for use in protein 19F NMR." <u>Biochemistry</u> , 36(11):3404-3416 (1997)	
	35	DUNTEN & MOWBRAY. "Crystal structure of the dipeptide binding protein from Escherichia coli involved in active transport and chemotaxis." <u>Protein Science</u> 4(11):2327-2334 (1995).	
	36	ELLMAN ET AL. "Biosynthetic method for introducing unnatural amino acids site-specifically into proteins." <u>Methods in Enzymol.</u> , 202:301-336 (1992)	
	37	ELLMAN ET AL. "Site-specific incorporation of novel backbone structures into proteins." <u>Science</u> , 255:197-200 (1992)	
	38	ENGLAND ET AL. "Backbone Mutations in Transmembrane Domains of a Ligand-Gated Ion Channel: Implications for the Mechanism of Gating." <u>Cell</u> , 96(1):89-98 (1999)	
	39	FECHTER ET AL. "Major tyrosine identity determinants in Methanococcus jannaschii and Saccharomyces cerevisiae tRNA ^{Tyr} are conserved but expressed differently." <u>Eur. J. Biochem.</u> 268(3):761-767 (2001).	
	40	FENG ET AL. "Expanding tRNA recognition of a tRNA synthetase by a single amino acid change." <u>PNAS</u> 100(10): 5676-5681 (2003)	
	41	FORSTER ET AL. "Programming peptidomimetic synthetases by translating genetic codes designed de novo." <u>PNAS</u> 100(11):6353-6357 (2003)	
	42	FRANCISCO ET AL. (1993) "Production and fluorescence-activated cell sorting of Escherichia coli expressing a functional antibody fragment on the external surface." <u>PNAS</u> 90:10444-8	
	43	FRANCKLYN ET AL. "Aminoacyl-tRNA synthetases: Versatile players in the changing theater of translation." <u>RNA</u> , 8(11):1363-1372 (2002)	
	44	FRIEDMAN & CHATTERJI. "Synthesis of Derivatives of Glutamine as Model Substrates for Anti-Tumor Agents." <u>J. Am. Chem. Soc.</u> 81(14):3750-3752 (1959)	
	45	FURTER. "Expansion of the genetic code: site-directed p-fluoro-phenylalanine incorporation in Escherichia coli." <u>Protein Sci.</u> , 7(2):419-426 (1998)	
	46	GABRIEL & MCCLAIN. "A set of plasmids constitutively producing different RNA levels in Escherichia coli." <u>J. Mol. Biol.</u> 290:385-389 (1999)	
	47	GAETTA ET AL. "Multicolor and electron microscopic imaging of connexin trafficking." <u>Science</u> 296(5567):503-507 (2002)	
	48	GALLIVAN ET AL. "Site-specific incorporation of biotinylated amino acids to identify surface-exposed residues in integral membrane proteins." <u>Chem. Biol.</u> , 4(10):739-749 (1997)	
	49	GAY ET AL. "Modification of the amino acid specificity of tyrosyl-tRNA synthetase by protein engineering." <u>FEBS Lett.</u> 318(2):167-171 (1993)	
	50	GenBank Accession number E64348, BULT et al. 'Complete genome sequence of the methanogenic archaeon, Methanococcus jannaschii,' Gene Sequence, 03 June 1996.	
	51	GenBank Accession Number Q57834, publication date October 16, 2001, date of retrieval October 6, 2003.	
/K.G./	52	GEOGHEGAN & STROH. "Site-directed conjugation of nonpeptide groups to peptides and proteins via periodate oxidation of a 2-amino alcohol. Application to modification at N-terminal serine." <u>Bioconjug. Chem.</u> 3(2):138-146 (1992)	

Examiner Signature	/Kagnew Gebreyesus/	Date Considered	08/09/2007
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

/K.G./	53	GIEGÉ ET AL. "Universal rules and idiosyncratic features in tRNA identity," <u>Nucleic Acids Res.</u> 26(22):5017-5035 (1998)	
↑	54	GIEGÉ ET AL. "Aspartate identity of transfer RNAs." <u>Biochimie</u> , 78(7):605-623 (1996)	
	55	GIULIANO ET AL. "Fluorescent protein biosensors: measurement of molecular dynamics in living cells." <u>Annu. Rev. Biophys. Biomol. Struct.</u> 24:405-434 (1995)	
	56	GRIFFIN ET AL. "Specific Covalent Labeling of Recombinant Protein Molecules Inside Live Cells." <u>Science</u> 281:269-272 (1998)	
	57	GUCKIAN & KOOL. "Highly Precise Shape Mimicry by a Difluorotoluene Deoxynucleoside, a Replication-Competent Substitute for Thymidine." <u>Angew. Chem. Int. Ed. Engl.</u> , 36(24):2825-2828 (1997).	
	58	HAMANO-TAKAKU ET AL. "A Mutant <i>Escherichia coli</i> Tyrosyl-tRNA Synthetase Utilizes the Unnatural Amino Acid Azatyrosine More Efficiently than Tyrosine." <u>J. Biol. Chem.</u> , 275(51):40324-40328 (2000)	
	59	HAO ET AL. "A New UAG-Encoded Residue in the Structure of a Methanogen Methyltransferase." <u>Science</u> 296(5572):1462-1466 (2002)	
	60	HE ET AL. "The gene cluster for chloramphenicol biosynthesis in <i>Streptomyces venezuelae</i> ISP5230 includes novel shikimate pathway homologues and a monomodular non-ribosomal peptide synthetase gene." <u>Microbiology</u> , 147(10):2817-2829 (2001)	
	61	HENDRICKSON ET AL. "Selenomethionyl proteins produced for analysis by multiwavelength anomalous diffraction (MAD): a vehicle for direct determination of three-dimensional structure." <u>EMBO J.</u> , 9(5):1665-1672 (1990)	
	62	HIRAO ET AL. "An unnatural base pair for incorporating amino acid analogues into protein," <u>Nature Biotechnology</u> , 20(2):177-182 (2002)	
	63	HOHSAKA ET AL. (1999) "Efficient Incorporation of Nonnatural Amino Acids with Large Aromatic Groups into Streptavidin in In Vitro Protein Synthesizing Systems." <u>J. Am. Chem. Soc.</u> , 121(1):34-40	
	64	HOHSAKA ET AL. "Efficient Incorporation of Nonnatural Amino Acids with Large Aromatic Groups into Streptavidin in In Vitro Protein Synthesizing Systems." <u>J. Am. Chem. Soc.</u> , 121(1):34-40 (1999)	
	65	HOHSAKA ET AL. "Incorporation of Two Different Nonnatural Amino Acids Independently into a Single Protein through Extension of the Genetic Code." <u>J. Am. Chem. Soc.</u> , 121(51): 12194-12195 (1999)	
	66	IBBA & HENNECKE. "Relaxing the substrate specificity of an aminoacyl-tRNA synthetase allows in vitro and in vivo synthesis of proteins containing unnatural amino acids." <u>FEBS Lett.</u> , 364(3):272-275 (1995)	
	67	IBBA ET AL. "Substrate specificity is determined by amino acid binding pocket size in <i>Escherichia coli</i> phenylalanyl-tRNA synthetase." <u>Biochemistry</u> , 33(23):7107-7112 (1994)	
	68	IBBA. "Strategies for in vitro and in vivo translation with non-natural amino acids." <u>Biotechnol Gente Eng. Rev.</u> 13:197-216 (1996)	
/K.G./	69	JAKUBOWSKI & GOLDMAN. "Editing of errors in selection of amino acids for protein synthesis," <u>Microbiol. Rev.</u> , 56(3):412-429 (1992)	

Examiner Signature	/Kagnew Gebreyesus/	Date Considered	08/09/2007
-----------------------	---------------------	--------------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

/K.G./	70	JERUZALMI & STEITZ. "Structure of T7 RNA polymerase complexed to the transcriptional inhibitor T7 lysozyme." <u>EMBO J.</u> , 17(14):4101-4113 (1998)	
	71	JUCOVIC AND HARTLEY. (1996) "Protein-protein interaction: a genetic selection for compensating mutations at the barnase-barstar interface." <u>PNAS</u> , 93(6):2343-2347	
	72	KIGA ET AL. (2002) "An engineered <i>Escherichia coli</i> tyrosyl-tRNA synthetase for site-specific incorporation of an unnatural amino acid into proteins in eukaryotic translation and its application in a wheat germ cell-free system." <u>PNAS</u> , 99(15): 9715-9720.	
	73	KIICK & TIRRELL. "Protein Engineering by In Vivo Incorporation of Non-Natural Amino Acids: Control of Incorporation of Methionine Analogues by Methionyl-tRNA Synthetase," <u>Tetrahedron</u> , 56(48):9487-9493 (2000).	
	74	KING AND KIDD. "A New Synthesis of Glutamine and of γ -Dipeptides of Glutamic Acid from Phthylated Intermediates." <u>J. Chem. Soc.</u> , 4:3315-3319 (1949)	
	75	KLEEMAN ET AL. "Human Tyrosyl-tRNA Synthetase Shares Amino Acid Sequence Homology with a Putative Cytokine" <u>J. Biol. Chem.</u> , 272(22):14420-14425 (1997)	
	76	KLEINA ET AL. "Construction of <i>Escherichia coli</i> amber suppressor tRNA genes. II. Synthesis of additional tRNA genes and improvement of suppressor efficiency." <u>J. Mol. Biol.</u> 213(4):705-717 (1990)	
	77	KOOL. "Synthetically modified DNAs as substrates for polymerases," <u>Curr. Opin. Chem. Biol.</u> , 4(6):602-608 (2000)	
	78	KOSKINEN & RAPOPORT. "Synthesis of 4-Substituted Prolines as Conformationally Constrained Amino Acid Analogues." <u>J. Org. Chem.</u> 54(8):1859-1866. (1989).	
	79	KOWAL & OLIVER. "Exploiting unassigned codons in <i>Micrococcus luteus</i> for tRNA-based amino acid mutagenesis," <u>Nucl. Acid. Res.</u> , 25(22):4685-4689 (1997)	
	80	KOWAL ET AL. "Twenty-first aminoacyl-tRNA synthetase-suppressor tRNA pairs for possible use in site-specific incorporation of amino acid analogues into proteins in eukaryotes and in eubacteria." <u>Proc. Natl. Acad. Sci. U S A</u> , 98(5):2268-2273 (2001)	
	81	KRIEG ET AL., "Photocrosslinking of the signal sequence of nascent preprolactin of the 54-kilodalton polypeptide of the signal recognition particle," <u>Proc. Natl. Acad. Sci.</u> 83(22):8604-8608 (1986).	
	82	KWOK & WONG. "Evolutionary relationship between <i>Halobacterium cutirubrum</i> and eukaryotes determined by use of aminoacyl-tRNA synthetases as phylogenetic probes." <u>Can. J. Biochem.</u> , 58(3):213-218 (1980)	
	83	LEE AND XUN. "Novel Biological Process for L-DOPA Production from L-Tyrosine by P-Hydroxyphenylacetate 3-Hydroxylase," <u>Biotechnology Letters</u> , 20(5):479-482, (1998)	
	84	LIU & SCHULTZ. (1999) "Progress toward the evolution of an organism with an expanded genetic code." <u>PNAS</u> , 96(9):4780-4785	
	85	LIU ET AL. (1997) "Engineering a tRNA and aminoacyl-tRNA synthetase for the site-specific incorporation of unnatural amino acids into protein in vivo." <u>PNAS</u> , 94(19):10092-10097	
	86	LIU ET AL. "Characterization of an 'orthogonal' suppressor tRNA derived from <i>E. coli</i> tRNA _{2^{Gln}} " <u>Chem. Biol.</u> , 4:685-691 (1997)	
/K.G./	87	LORINCZ ET AL. "Enzyme-generated intracellular fluorescence for single-cell reporter gene analysis utilizing <i>Escherichia coli</i> beta-glucuronidase." <u>Cytometry</u> , 24(4):321-329 (1996)	

Examiner Signature	/Kagnew Gebreyesus/	Date Considered	08/09/2007
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

/K.G./	88	LU ET AL. "Probing ion permeation and gating in a K ⁺ channel with backbone mutations in the selectivity filter." <u>Nat. Neurosci.</u> , 4(3):239-246 (2001)	
	89	MA ET AL. "In vitro protein engineering using synthetic tRNA ^{Ala} with different anticodons." <u>Biochemistry</u> , 32(31):7939-7945 (1993)	
	90	MAGLIERY ET AL. "Expanding the Genetic Code: Selection of Efficient Suppressors of Four-base Codons and Identification of "Shifty" Four-base Codons with a Library Approach in <i>Escherichia coli</i> ," <u>J. Mol. Biol.</u> , 307(3): 755-769 (2001)	
	91	MAHAL ET AL. "Engineering chemical reactivity on cell surfaces through oligosaccharide biosynthesis." <u>Science</u> , 276(5315):1125-1128 (1997)	
	92	MANNUZZU ET AL. "Direct Physical Measure of Conformational Rearrangement Underlying Potassium Channel Gating." <u>Science</u> , 271(5246):213-216 (1996)	
	93	MATSOUKAS ET AL. "Differences in Backbone Structure between Angiotensin II Agonists and Type I Antagonists ." <u>J. Med. Chem.</u> , 38(23): 4660-4669 (1995)	
	94	MCMINN ET AL. "Efforts toward Expansion of the Genetic Alphabet: DNA Polymerase Recognition of a Highly Stable, Self-Pairing Hydrophobic Base," <u>J. Am. Chem. Soc.</u> , 121(49):11585-11586 (1999)	
	95	MEGGERS ET AL. "A Novel Copper-Mediated DNA Base Pair," <u>J. Am. Chem. Soc.</u> , 122(43):10714-10715 (2000)	
	96	MENDEL ET AL. "Site-Directed Mutagenesis with an Expanded Genetic Code," <u>Annu. Rev. Biophys. Biomol. Struct.</u> 24:435-462 (1995)	
	97	MILLER ET AL. "Flash decaging of tyrosine sidechains in an ion channel," <u>Neuron</u> , 20(4):619-624 (1998)	
	98	MINKS ET AL. "Noninvasive tracing of recombinant proteins with "fluorophenylalanine-fingers". <u>Anal. Biochem.</u> , 284(1):29-34 (2000)	
	99	MOORE ET AL. "Quadruplet codons: implications for code expansion and the specification of translation step size." <u>J. Mol. Biol.</u> , 298(2):195-209 (2000)	
	100	NICKITENKO ET AL. "2 A resolution structure of DppA, a periplasmic dipeptide transport/chemosensory receptor." <u>Biochemistry</u> 34(51):16585-16595 (1995)	
	101	NILSSON ET AL. "A synthetic IgG-binding domain based on staphylococcal protein A." <u>Protein Eng.</u> 1(2):107-113 (1987)	
	102	NOREN ET AL. (1989) "A general method for site-specific incorporation of unnatural amino acids into proteins." <u>Science</u> , 244(4901):182-188	
	103	NOWAK ET AL. "Nicotinic receptor binding site probed with unnatural amino acid incorporation in intact cells." <u>Science</u> , 268(5209):439-442 (1995)	
	104	OGAWA ET AL. "Efforts toward the Expansion of the Genetic Alphabet: Information Storage and Replication with Unnatural Hydrophobic Base Pairs." <u>J. Am. Chem. Soc.</u> , 122(14):3274-3287 (2000)	
	105	OGAWA ET AL. "Rational Design of an Unnatural Base Pair with Increased Kinetic Selectivity," <u>J. Am. Chem. Soc.</u> , 122(36):8803-8804 (2000).	
↓ /K.G./	106	OHNO ET AL. "Co-expression of yeast amber suppressor tRNA ^{Tyr} and tyrosyl-tRNA synthetase in <i>Escherichia coli</i> : possibility to expand the genetic code," <u>J. Biochem.</u> 124(6): 1065-1068 (1998)	

Examiner Signature		Date Considered	
-----------------------	--	--------------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

/K.G./	107	OKELEY. & VAN DER DONK. "Novel cofactors via post-translational modifications of enzyme active sites." <u>Chem. Biol.</u> 7, R159-R171 (2000)	
	108	O'MAHONY ET AL. (1989) "Glycine tRNA mutants with normal anticodon loop size cause 1 frameshifting." <u>PNAS</u> , 86(20):7979-7983	
	109	PASTRNAK & SCHULTZ. "Phage selection for site-specific incorporation of unnatural amino acids into proteins in vivo." <u>Bioorg. Med. Chem.</u> , 9(9):2373-2379 (2001)	
	110	PASTRNAK ET AL. "A new orthogonal suppressor tRNA/aminoacyl-tRNA synthetase pair for evolving an organism with an expanded genetic code." <u>Helv Chim Acta</u> 83:2277-2286 (2000)	
	111	PICCIRILLI ET AL. "Enzymatic incorporation of a new base pair into DNA and RNA extends the genetic alphabet," <u>Nature</u> , 343:33-37 (1990)	
	112	SAKS ET AL. "An Engineered <i>Tetrahymena</i> tRNA ^{Gln} for <i>in Vivo</i> Incorporation of Unnatural Amino Acids into Proteins by Nonsense Suppression." <u>J.Biol. Chem.</u> 271(38): 23169-23175 (1996)	
	113	SANTORO & SCHULTZ. "Directed evolution of the site specificity of Cre recombinase." <u>Proc. Natl. Acad Sci USA</u> , 99(7):4185-4190 (2002)	
	114	SANTORO ET AL. "An efficient system for the evolution of aminoacyl-tRNA synthetase specificity." <u>Nature Biotech.</u> , 20:1044-1048	
	115	SAYERS ET AL. "5', 3' Exonuclease in phosphorothioate-based oligonucleotide-directed mutagenesis." <u>Nucleic Acids Res.</u> , 16(3):791-802 (1988)	
	116	SHARMA ET AL. "Efficient introduction of aryl bromide functionality into proteins in vivo." <u>FEBS Lett.</u> , 467(1):37-40 (2000)	
	117	SIEBER ET AL. "Libraries of hybrid proteins from distantly related sequences." <u>Nature Biotechnology</u> , 19:456-460 (2001)	
	118	SPRINZL ET AL. "Compilation of tRNA sequences and sequences of tRNA genes," <u>Nucleic Acids Res.</u> 26(1):148-153 (1998)	
	119	SRINIVASAN . & KRZYCKI. "Pyrrolysine Encoded by UAG in Archaea: Charging of a UAG-Decoding Specialized tRNA." <u>Science</u> 296(5572):1459-1462 (2002)	
	120	STEER & SCHIMMEL. "Major anticodon-binding region missing from an archaeobacterial tRNA synthetase." <u>J. Biol. Chem.</u> 274(50):35601-35606 (1999)	
	121	SUBASINGHE ET AL., "Quisqualic acid analogues: synthesis of beta-heterocyclic 2-aminopropanoic acid derivatives and their activity at a novel quisqualate-sensitized site." <u>J. Med. Chem.</u> 35(24):4602-4607 (1992)	
	122	SUSSMAN ET AL. "Crystal structure of yeast phenylalanine transfer RNA. I. Crystallographic refinement," <u>J. Mol. Biol.</u> 123(4):607-630 (1978)	
	123	SWITZER ET AL. "Enzymatic incorporation of a new base pair into DNA and RNA." <u>J. Am. Chem. Soc.</u> , 111(21):8322-8323 (1989)	
	124	TAE ET AL. "Efforts toward expansion of the genetic alphabet: replication of DNA with three base pairs," <u>J. Am. Chem. Soc.</u> , 123(30):7439-7440 (2001)	
	125	TANG ET AL. "Fluorinated Coiled-Coil Proteins Prepared In Vivo Display Enhanced Thermal and Chemical Stability." <u>Angew. Chem. Int. Ed. Engl.</u> , 40(8):1494-1496 (2001)	
↓ /K.G./			

Examiner Signature	/Kagnew Gebreyesus/	Date Considered	08/09/2007
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

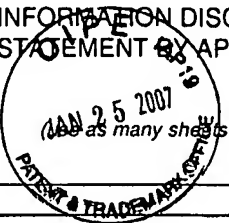
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

/K.G./	126	TURCATTI ET AL. "Probing the Structure and Function of the Tachykinin Neurokinin-2 Receptor through Biosynthetic Incorporation of Fluorescent Amino Acids at Specific Sites." <u>J. Biol. Chem.</u> , 271(33):19991-19998 (1996);	
↑	127	VAN HEST & TIRRELL. "Efficient introduction of alkene functionality into proteins in vivo." <u>FEBS Lett.</u> , 428(1-2):68-70 (1998)	
	128	VAN HEST ET AL. "Efficient Incorporation of Unsaturated Methionine Analogues into Proteins in Vivo." <u>J. Am. Chem. Soc.</u> , 122(7):1282-1288 (2000)	
	129	WAKASUGI ET AL. "Genetic code in evolution: switching species-specific aminoacylation with a peptide transplant." <u>EMBO J.</u> 17(1):297-305 (1998)	
	130	WANG & SCHULTZ "A General Approach for the Generation of Orthogonal tRNAs," <u>Chem. Biol.</u> 8:883-890 (2001)	
	131	WANG & SCHULTZ. "Expanding the genetic code," <u>Chem. Commun.</u> , 1:1-11 (2002)	
	132	WANG ET AL. "A new functional suppressor tRNA/aminoacyl-tRNA synthetase pair for the in vivo incorporation of unnatural amino acids into proteins," <u>J. Am. Chem. Soc.</u> 122:5010-5011 (2000)	
	133	WANG ET AL. "Addition of the keto functional group to the genetic code of Escherichia coli." <u>PNAS</u> , 100(1):56-61 (2003)	
	134	WANG ET AL. "Adding L-3-(2-Naphthyl)alanine to the Genetic Code of E. coli," <u>J. Am. Chem. Soc.</u> 124:1836-1837(2002)	
	135	WANG ET AL. "Expanding the genetic code of Escherichia coli." <u>Science</u> , 292(5516):498-500 (2001)	
	136	WANG ET AL. "Expanding the genetic code." <u>Angew. Chem. Int. Ed.</u> , 44(1):34-66 (2004)	
	137	WEINER ET AL. "A binding protein for L-glutamine and its relation to active transport in E. coli." <u>Archives of Biochemistry and Biophysics</u> , 124(2):715-717 (1971)	
	138	WHELIHAN & SCHIMMEL. "Rescuing an essential enzyme-RNA complex with a non-essential appended domain." <u>EMBO J.</u> , 16(10):2968-2974 (1997)	
	139	WU ET AL. "Studying organelle physiology with fusion protein-targeted avidin and fluorescent biotin conjugates," <u>Methods Enzymol.</u> 327:546-64 (2000)	
	140	WU ET AL. "Enzymatic phosphorylation of unnatural nucleosides," <u>J. Am. Chem. Soc.</u> 124(49):14626-14630 (2002)	
	141	YARUS. "Translational efficiency of transfer RNA's: Use of an expanded anticodon." <u>Science</u> 218(4573):646-652 (1982)	
	142	ZHANG ET AL. "The Selective Incorporation of Alkenes into Proteins in Escherichia coli." <u>Angew. Chem. Int. Ed. Engl.</u> 41(15):2840-2842 (2002)	
/K.G./	143	ZLOKARNIK ET AL. "Quantitation of Transcription and Clonal Selection of Single Living Cells with B-Lactamase as Reporter." <u>Science</u> , 279(5347):84-88 (1998)	

Examiner Signature	/Kagnew Gebreyesus/	Date Considered	08/09/2007
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A-B/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT  (Use as many sheets as necessary)	Complete if Known	
	Application Number	10/530,421
	Filing Date	May 4, 2005
	First Named Inventor	Peter G. Schultz
	Group Art Unit	1652
	Examiner Name	Unassigned
	Attorney Docket Number	54A-000170US
Date Submitted	January 23, 2007	

U.S. PATENT DOCUMENTS						
Examiner Initials	Cite No.	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code (if known)			

FOREIGN PATENT DOCUMENTS								
Examiner Initials	Cite No.	Foreign Patent Document			Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T
		Office	Number	Kind Code (if known)				

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T
/K.G./	1	BULT ET AL. "Complete Genome Sequence of the Methanogenic Archaeon, Methanococcus jannaschii," <i>Methanocaldococcus jannaschii</i> DSM 2661, complete genome, GenBank Accession Number AAB98375 (December 20, 2005).	
/K.G./	2	BULT ET AL. "Complete Genome Sequence of the Methanogenic Archaeon, Methanococcus jannaschii," <i>Methanocaldococcus jannaschii</i> DSM 2661, section 33 of 150 of the complete genome, GenBank Accession Number AAB98375 (June 2, 2004).	

APPROVED

Examiner Signature	/Kagnew Gebreyesus/	Date Considered	08/09/2007
-----------------------	---------------------	--------------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.